

REMARKS

The Examiner has required restriction under 35 U.S.C. § 121 between claims 1-68 (drawn to a method of forming an integrated circuit), and claims 69-88 (drawn to an integrated circuit). Applicant hereby elects without traverse claims 1-68 for prosecution on the merits. Accordingly, claims 69-88 have been cancelled without prejudice.

Claims 1, 4, 12, 13, 17, 25, 27, 32, 33, 43, 50, 51, 57 and 64 are amended. Claims 3, 16, 52, 54 and 69-88 are canceled. Claims 89 and 90 are added. Claims 1, 2, 4-15, 17-51, 53, 55-68, 89 and 90 are in the application for consideration.

Claims 3 and 16 have been rewritten in independent form, and otherwise amended, into their respective independent claims 1 and 12. Independent claim 1 is also amended to recite that the enriched region is spaced beneath the outer surface and does not extend thereto. Independent claim 12 is amended to recite that the implant of at least one of Al and Ga is spaced beneath the outer surface and does not extend thereto. Support for the same is inherent in Applicant's application as-filed, for example as shown in Fig.3 and the specification text pertaining thereto.

Claims 3 and 16 previously stood rejected as being anticipated by U.S. Patent No. 4,514,251 to van Ommen et al. As amended, independent claims 1 and 12 recite that the subject material or region is spaced beneath the outer surface and does not extend thereto, as asserted above. van Ommen et al. is seen to everywhere disclose an essential homogeneous

distribution of any of their implanted materials within their effected layers, and regardless, does not suggest or teach any of its material/region as being spaced beneath its outer surface such that it does not extend thereto. Accordingly, independent claims 1 and 12, as amended, should be allowed, and action to that end is requested.

Claims 4 and 13 are rewritten in independent form, with each reciting the incorporation of Al with such enhancing selectivity to the silicon nitride comprising layer during the removing than would otherwise occur in the absence of said Al. Claims 4 and 13 stand rejected as being obvious over a combination of van Ommen et al. with Koshino et al. Essentially, the Examiner asserts that it would be obvious to substitute the aluminum of Koshino et al. within the van Ommen et al. teaching "because aluminum and gallium are equivalents for the purpose of ion implantation of silicon nitride films, as evidenced by Koshino's disclosure." Applicant disagrees and requests reconsideration.

Specifically, Koshino et al. merely discloses utilizing gallium or aluminum as a conductivity enhancing impurity for ultimate use in its low-concentration impurity layer 18a. Koshino et al. teaches nothing about any processing regarding selectively removing one material relative to another. While the Koshino et al. reference does teach the provision of either aluminum or gallium into a silicon nitride layer for use as a dopant out-source for an underlying silicon material, the reference does not in any way teach or suggest that the provision of Al in a region would have any

effect in an etch, let alone the claimed enhancement in selectivity in etching a silicon dioxide comprising layer substantially selectively relative to a silicon nitride comprising layer containing aluminum than would otherwise occur in the absence of the aluminum. There simply is no such teaching in Koshino et al. that substitution of its aluminum for the gallium of van Ommen et al. would result in the respective removing steps recited in independent claims 4, 13, and 50, and the results achieved thereby. The Examiner is reminded that such claims are method claims, not structure claims. The fact that one material might be substituted for another does not suggest the independent claims 4, 13 and 50 combinations. Accordingly, independent claims 4, 13 and 50 should be allowed, and action to that end is requested.

Independent claims 17 and 27 stand rejected as being obvious over a combination of van Ommen et al., Koshino et al. and Herndon et al. Applicant disagrees and requests reconsideration. Each such claim recites the removing of a doped silicon dioxide comprising layer substantially selectively relative to a substantially undoped silicon dioxide comprising layer with selectivity being enhanced by the presence of at least one of B, Al and Ga than would otherwise occur in the absence of the B, Al, Ga or mixtures thereof. The Examiner's rejection of such claim over this combination of references is predicated upon a teaching that silicon dioxide and silicon nitride are materials which can be substituted for one another, and that the art teaches ion implantation of such layers. However, absolutely none of these references, taken alone and therefore not in

combination, teaches anything to do with selectively removing doped silicon dioxide selectively relative to undoped silicon dioxide. Therefore, there is no teaching whatsoever in any of these three references of how one would go about etching doped silicon dioxide substantially selectively relative to undoped silicon dioxide, nor what if any effect the presence of one material would have on selectivity. Accordingly, while silicon dioxide and silicon nitride might be interchangeable as implanted insulators in the fabrication of integrated circuitry (i.e., in a structure claim), there is no teaching in any one of the applied references of removing doped silicon dioxide substantially selectively relative to undoped silicon dioxide, and therefore certainly no suggestion or teaching that selectivity is enhanced by the presence of B, Al, Ga or mixtures thereof in the etch than would otherwise occur in the absence of B, Al, Ga or mixtures thereof. As each of the references is lacking in this regard, their combination does not suggest that which Applicant recites in independent claims 17 and 27. All of the facets of Applicant's independent claims 17 and 27 are not encompassed by the three cited references. Accordingly, such claims should be allowed, and action to that end is requested.

Independent claims 33 and 43 recite methods of forming a contact opening with an insulative material to a node location between a pair of conductive device components. Each recites the formation of a pair of spaced conductive device components over a semiconductor substrate with each device component having at least one sidewall which faces the other

device component of the pair. Claim 33 recites an insulative material mass formed over each of the sidewalls, and which are laterally spaced from one another in a non-contacting relationship. The masses include a first insulative material and have a respective lateral outer region comprising B, Al, Ga or mixtures thereof. None of van Ommen et al, Koshino et al. or Herndon et al. is seen to disclose such a construction, or even individually suggest such a construction. Accordingly, independent claim 33 recites something which is neither shown nor suggested in the references individually, and thus certainly is not suggested by the references in combination. Independent claim 33 further recites etching a contact opening into a different second insulative material to a node location between the insulative material masses, with the lateral outer enriched regions enhancing selectivity to the insulative masses during the etching than would otherwise occur in the absence of B, Al, Ga or mixtures thereof. As the cited references do not individually suggest the lateral outer enriched regions as described above, the references neither alone nor in combination could suggest processing aspects associated with selective etching in the manner which Applicant recites in claim 33. For at least this additional reason, independent claim 33 should be allowed, and action to that end is requested.

Independent claim 43 should be allowed for these same essential reasons argued with respect to claim 33. Action to that end is requested.

Independent claim 57 should be allowed for at least the same reasons argued above with respect to the allowability of claims 17 and 27. Action to that end is requested.

Independent claim 64 is similar to independent claim 33, but does not require that the insulative material masses have a lateral outer enriched region, but is required to comprise B, Al, Ga or mixtures thereof. Such material is claimed in an act of etching substantially selectively relative to the insulative material masses to enhance selectivity to the insulative material masses than would otherwise occur in the absence of B, Al, Ga or mixtures thereof. As asserted above, the van Ommen et al. reference does not disclose the formation of a pair of spaced conductive device components having respective insulative material masses formed over each of the sidewalls of the device components and laterally spaced from one another in a non-contacting relationship, and thereafter, etching in the manner recited in independent claim 64. The relied upon Koshino et al. and Herndon et al. references do not overcome or otherwise disclose these deficiencies of van Ommen et al. Accordingly, the collection of references does not encompass all of the limitations of independent claim 64, and the obviousness rejection thereof should therefore be withdrawn. Action to that end is requested.

Applicant's dependent claims should be allowed as depending from allowable base claims, and for their own recited features which are neither shown nor suggested in the cited art. Action to that end is requested.

Independent claims 89 and 90 are added. Claim 89 is patterned after original independent claim 1, while claim 90 is patterned after original independent claim 12. However, each emphasizes that the inclusion of Al, Ga or mixture thereof enhances selectivity than would otherwise occur in the absence of such material, and also to further recite that the removing is void of any annealing of the silicon nitride comprising layer prior to the removing. Such is clearly supported in Applicant's application as-filed, for example in the last three sentences of the paragraph beginning on line 3 of page 8, and claims 1 and 7 when considered in combination as-filed. The specification clearly supports and discloses that Applicant has possession of no annealing occurring of the stated silicon nitride comprising layer after its formation before the stated removing actions. Clearly, independent claim 89 and 90 are neither anticipated nor obvious over van Ommen et al. Specifically, van Ommen et al. clearly everywhere teaches the requirement of an annealing action to achieve the stated selective etch. See, for example, col.1, Ins.44-59. Accordingly, the van Ommen et al. teaching everywhere is that etch selectivity decreases by the provision of implanted gallium or the other stated materials in the absence of the everywhere stated to be required annealing. Accordingly, independent claims 89 and 90 recite something which is not shown or found within the four corners of the van Ommen et al. document. Further, what Applicant recites in independent claim 89 and 90 would not be obvious over van Ommen et al. as they everywhere teach the exact opposite of what Applicant positively recites in

added independent claims 89 and 90. Accordingly, such claims should be allowed, and action to that end is requested.

This application is believed to be in immediate condition for allowance, and action to that end is requested. If the Examiner's next anticipated action is to be anything other than a Notice of Allowance, the undersigned respectfully requests a telephone interview prior to issuance of any such subsequent action.

Respectfully submitted,

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By:



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